

## NAS NORTH ISLAND - NAVY REGION SOUTHWEST NAVY ENVIRONMENTAL LEADERSHIP PROGRAM

### CLEANUP

#### USRADS® SURVEY

##### LEAD ACTIVITY

Naval Air Station (NAS) North Island

##### STATUS

Complete

##### MISSION

Conduct geophysical and radiological survey with real-time results

##### REQUIREMENT

Underground storage tanks are used at Navy stations to store fuel products for aviation and ground transport vehicles. The locations of some formerly used tanks may no longer be known, requiring certain technologies to locate the tanks. In addition, other metal targets may need to be delineated. Such technology will benefit all Navy stations and other facilities where the locations of metal structures need to be delineated.

##### DESCRIPTION

The Navy used Oak Ridge National Laboratory's (ORNL) Ultra Sonic Ranging and Data System® (USRADS®) as the first step in a remedial investigation of shoreline slag deposited at NAS North Island, Site 10. The primary purpose was to determine the physical extent of the slag and the surface radiological condition of the area. The Navy has purchased USRADS® and it is available for use through the Radiological Affairs Support Office (RASO). It has since been used to determine the level of radioactive contamination at Site 2 at NAS North Island.

Site 2 is a landfill with disposed radium dials and

a scoping survey was performed to supplement the limited data previously collected on the site. The area was defined as contaminated and the remediation design was reviewed for compliance with the California Environmental Quality Act (CEQA).

USRADS® is used in conjunction with a Geonics EM-61 electromagnetometer to perform a geophysical survey. The Geonics EM-61 electromagnetometer is a relatively new application of electromagnetic (EM) geophysics, specifically configured to detect buried metal targets. This technology can distinguish between conductive earth materials and metal targets, making the determination of buried drums, tanks, and other



USRADS® in use at Site 10

items more precise. The device is a small, trailer-mounted electromagnetometer with a portable, coincident time-domain transmitter and receiver. It is easy to use, is relatively unaffected by most interference, and provides a good depth of detection. The electromagnetometer generates 150 EM pulses per second and measures the response during the off-times between pulses. After each pulse, secondary EM fields are induced briefly in moderately conductive earth and for a longer time in highly conductive metal targets. The EM-61 measures a path approximately 4 feet wide at the surface; however, because the signals expand with depth, the survey lines actually overlap at depth when a 4-foot path is followed. The system measures two channels of secondary response. Two air-cored coils provide the source. The EM sensors consist of the same two air-cored coils, configured with the main coil 12 inches off the ground and the focusing coil located 16 inches above the main coil. Data are collected on two channels. A third channel of data is created by measuring the difference in response on the two coils.

The USRADS<sup>®</sup> part of the probe is the data positioner, an alternative to a GPS (Global Positioning System). USRADS<sup>®</sup> utilizes ultrasonic, radio frequency transmission, and microcomputers to pinpoint a position. The ultrasonic transmission fixes the location of the detector, while the radio frequency provides data telemetry and system synchronization. The microcomputers collect and calculate precise locations of the data points in real-time. ORNL also has modified USRADS<sup>®</sup> to accept a wide variety of sensing devices including x-ray fluorescence detectors for surface heavy metals and geophysical instruments for mapping subsurface conditions and anomalies.



Computer Equipment used with USRADS<sup>®</sup>

## **BENEFITS**

- Real-time positional information correlated with survey data is automatically entered into a database in the field
- Creates report-ready tables and graphics directly from the field-entered data
- Increases survey reliability by ensuring complete coverage of a site and mathematical errors are eliminated when converting direct instrument readout to appropriate units

## **ACCOMPLISHMENTS/CURRENT STATUS**

<b>Date</b>	<b>Activity</b>
APR 1996	Work Plan approved
JUN 1996	Survey completed
JUN 1997	Final site reconnaissance survey report submitted to Department of Toxic Substances Control (DTSC)
JAN 1998	Navy RASO purchased USRADS® unit

## **FUTURE PLAN OF ACTION & MILESTONES**

Not applicable

## **COLLABORATION/TECHNOLOGY TRANSFER**

Because of the successful use of USRADS® at Site 10, the Navy RASO purchased a unit that is available for use at other sites. It has been used at Site 2 through the Navy RASO.

## **BIBLIOGRAPHY**

- ORNL, Shoreline Slag Extended RI/RFI Work Plan for Site 10 Defense Reutilization Management Office NAS North Island. 1996.
- ORNL, Final Reconnaissance Survey Report. June 1997.

## **RELATED GOVERNMENT INTERNET SITES**

[ORNL ETS USRADS® and INRADS®](#)

## **RELATED NAVY GUIDEBOOK REQUIREMENT**

- 02014 Closure Performance Standards & Decontamination of Less Than 90-Day Hazardous Waste Management Units
- 02039 Solid Waste Management Unit (SWMU) Cleanup

*UPDATED: 01/23/02*